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## INFLUENCE OF OCCUPATIONS UPON MORTALITY.

*Journal de la Société de Statistique de Paris.* October and November, 1892.

The general effect of vocation upon health has been studied scientifically but twice in France; the first time by Gustave Hubbard, in 1852, and the second recently by Dr. Bertillon, the chief of the statistical bureau of Paris, who has tabulated the returns of several mutual aid societies among the Lyons silk operatives. The special importance of this paper, *De la morbidité et de la mortalité par profession*, by Dr. Jacques Bertillon, attaches to the mortality statistics, the definition of sickness by the various aid societies which furnished the figures of morbidity being too various and conflicting to serve as a basis for generalization; nevertheless, a few conclusions as to relative morbidity, which the author draws, are interesting. It appears that women from 20 to 25 years of age, in the Austrian societies, lose considerably more time from sickness than the men of the same age, but after 45 years the losses are more nearly equal. Among the silk workers of Lyons both the morbidity and mortality of women exceed that of men, although this is not in general true of the whole population; and the Italian societies furnish results which bear out the same conclusions. Yet the general mortality of the women, without regard to age, is less than that of the men, although the mortality at each age is greater. This apparent contradiction is due to the fact that 42 per cent of the women are under 40 years of age, while but 20 per cent of the men are below this age. Among the Lyons operatives (1872-89) the average number of days lost from illness annually among the women was 9.390; among men, 7.810; but the average mortality among the men was 23.4 per 1000, while that of the women was only 17.6. In various Italian societies, whose records are compared in this way, the women lost 8.5 days in the year from illness, while the men were incapacitated but 6.6 days; but here, as before, the mortality for men was higher, being 11.7 pro mille, as against 10.7 for the women.

The general results of the investigations, as to the effect of age upon the mortality rates, are contained in the following table:—

| Ages.    | English Tables.                      |                                                           |          |          | French Tables.           |                                           | Italian Table.                 |
|----------|--------------------------------------|-----------------------------------------------------------|----------|----------|--------------------------|-------------------------------------------|--------------------------------|
|          | Friendly Society. (Masc.) Finlaison. | Manchester Unity of Odd Fellows. (Masc.) Henry Ratcliffe. |          |          | Mutual Society. Hubbard. | Silk Workers of Lyons. (Masc.) Bertillon. | Mutual Society. (Masc.) Bodio. |
|          | 1846-50.                             | 1846-48.                                                  | 1856-60. | 1866-70. | 1835-49.                 | 1872-89.                                  | 1881-85.                       |
| 20-25    | 7.48                                 | 7.40                                                      | 7.58     | 6.43     | 8.5                      | 13.0                                      | 6.3                            |
| 25-30    | 7.29                                 | 7.90                                                      | 7.48     | 7.62     | 7.5                      | 5.4                                       | 5.9                            |
| 30-35    | 7.96                                 | 8.70                                                      | 8.34     | 8.18     | 9.5                      | 6.4                                       | 6.2                            |
| 35-40    | 8.93                                 | 9.16                                                      | 9.91     | 9.77     | 8.2                      | 6.4                                       | 7.8                            |
| 40-45    | 11.00                                | 11.65                                                     | 11.78    | 12.58    | 8.9                      | 10.2                                      | 9.2                            |
| 45-50    | 13.06                                | 13.99                                                     | 14.21    | 14.29    | 15.5                     | 11.8                                      | 11.6                           |
| 50-55    | 16.36                                | 18.61                                                     | 17.95    | 19.05    | 16.3                     | 20.2                                      | 14.9                           |
| 55-60    | 23.60                                | 28.67                                                     | 26.09    | 24.92    | 20.3                     | 19.5                                      | 22.2                           |
| 60-65    | 28.55                                | 41.14                                                     | 35.66    | 35.37    | 29.9                     | 40.7                                      | 32.5                           |
| 65-70    | 43.91                                | 57.21                                                     | 54.99    | 52.09    | 54.3                     | 67.0                                      | 50.4                           |
| 70-75    | 62.03                                | 70.42                                                     | 68.25    | 78.11    | 134.3                    | 88.0                                      | 73.6                           |
| All Ages | 12.57                                | 9.75                                                      | 11.89    | 12.63    | 14.2                     | 23.5                                      | 11.7                           |

There is also a valuable series of diagrams, showing graphically the mortality, by occupations and ages, in Paris, England, and Switzerland, which illustrate the general conclusions which the author draws in the succeeding portions of the paper.

The occupations grouped according to general healthfulness, beginning with those which are least favorable to longevity, are: (1) professions involving exposure to the inclemencies of the weather without physical activity, as coachmen, cab-drivers, and carters; (2) professions exposing the individual to dust in the open air, including stone cutters, quarrymen, etc.; masons, slaters, and the like, have a death rate but slightly lower than these; (3) occupations with exposure to hard or metallic dusts in a confined space have as high an average mortality as the preceding class, no matter what the nature of the dust may be, as needle-makers, cutlers, file-grinders, potters, brush makers, etc.; (4) vocations exposing the artisan to soft or organic dusts, including millers, bakers, chimney-sweepers, etc.; (5) occupations carried on in heated, smoky, or vaporous atmospheres. Blacksmiths are a healthy class in Paris, though less so in England, and least so in Switzerland. Mechanics have an average rate of mortality; bakers a little higher, owing to the dusts; while glass-cutters are

seriously affected by the powder which is inhaled. Next in order come (6) occupations involving possible poisoning, as artists, potters, painters, plumbers, employes in chemical works, especially where mercury is present; tobacconists are included here, as well as those who are liable to contact with tainted or decaying substances, as tanners and butchers. The mortality in this group is generally considerable. (7) Groups of occupations with temptations to indulge in intoxicants, as wine merchants and hotel keepers. English brewers as a class have a lower death rate. (8) The class exposed to accidents of various kinds, as fishermen, quarrymen, and the like, whose mortality rate is also increased to considerations of other sorts, as in class (2). (9) Sedentary occupations cause a high rate of mortality, especially if they be carried on in impure air. A process of natural selection seems also to be at work here, as this class is generally recruited from the less vigorous portions of the population. The rate here is less than that of fruiterers and grocers, while fish dealers and haberdashers have an average mortality. Tailors have a high death rate, somewhat above that of engravers, watchmakers, and cobblers. The tenth class includes the so-called professions where the vitality is high, largely owing to the leisure which generally accompanies such a life. Priests, judges, and public functionaries have the lowest death rate of all in this group; and lawyers, architects, and engineers have a mortality below the average for the class. Physicians have a rate even lower than lawyers, especially in Paris. (10) Most conducive to longevity are those occupations which, like the first class, necessitate exposure to the weather, but which, unlike it, require considerable bodily activity, as market gardeners, florists, and watermen.

On the whole, then, these results bear out the conclusions arrived at by Professor Westergaard, in his studies of the English population. The more recent investigations of Dr. Ogle, which will soon be published, are also confirmed. To be sure, in these studies, the clergy is marked as the most healthy class of the population, their death rate being but 66 per cent of the average for 62 chosen occupations, according to Westergaard. And in Dr. Ogle's tables the mortality for the next higher class, the gardeners, is 8 per cent greater. Yet the clergy is a picked class in England, which has no counterpart in France. The conditions there are so widely different as to vitiate any

comparisons. In regard to the healthiest occupation cited by Dr. Bertillon, a curious result appears, that, while the position of small farmers is so enviable in England and Switzerland, the same class in Italy loses more days from sickness annually than the industrial population. This result is confirmed in the two distinct periods considered. In Switzerland, as in England, consumption is the most prevalent disease, and the rate of mortality due to it, among farmers, is twice as high as the average for the whole population.

This valuable paper concludes with eleven extended tables, which have been computed for the mortality by vocations in Paris, England and Wales, Switzerland, and the Italian and Austrian mutual aid societies. They indicate clearly the average number of days lost from sickness yearly, together with the cause of death when it occurs. The tables themselves should be very valuable to the actuary; but they are also of general interest to the statistician, and form a basis from which the further investigation of the subject can be readily continued.

WILLIAM Z. RIPLEY.

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#### FERTILITY OF MARRIAGES IN PRUSSIA ACCORDING TO THE RELIGIOUS CREEDS OF THE CONTRACTING PARTIES.

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The *Zeitschrift des Königlich Preussischen Statistischen Bureau*s for 1891 contains a very interesting article upon the fertility of marriages in the different religious sects of Prussia for sixteen years (*Eheliche Fruchtbarkeit bei den verschiedenen Religionsgemeinschaften in Preussen, 1875 bis 1890*).

Since 1875 the Royal Statistical Bureau has kept a valuable record of marriages and births, together with the religious beliefs of the contracting parties, as well as their social positions. The figures are vouched for, and the records of the Bureau thus furnish a basis for reckoning the average fertility of all marriages according to creeds, callings, and social groupings.

The following table is a summary of all the tables which are given in the above article. The Evangelical creed is the established religion of Prussia. The group "other Christian" includes all Christian creeds except the Evangelical and the Catholic.